

2025 PARO FORUM POLICY PAPER

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KEY RECOMMENDATIONS

The Paro Forum was held 22-24 February 2025 to coincide with the Birth Anniversary of His Majesty the King Jigme Khesar Namgyel Wangchuck. This biennial event was created with the intention to bring together the various stakeholders in Bhutan who work directly on issues regarding climate change. The theme for this year's Forum was "Water Management and Climate Change", focusing on the urgent challenges of water management and climate change in Bhutan, a nation heavily reliant on its water resources for hydropower, agriculture, and the well-being of its citizens.

Ten sessions focusing on watermanagement and climate change stretched over the course of three days, bringing together participants from government agencies, non-governmental organizations, national and international decision-making bodies, civil society organizations, the private sector, students, and interdisciplinary climate and environmental experts. The program began with a macro overview of climate change challenges, issues that are being experienced both internationally and nationally. This global analysis was followed by more regionally, and subsequently ,nationally focused issues in order to convey both common water challenges as well as those specific to Bhutan.

Session 1: Hydrology and Glacial Panel

The Forum's first panel provided a stark assessment of the cryosphere's decline, particularly in the Hindu Kush Himalayan (HKH) region, emphasizing its cascading effects on water resources and human livelihoods. Known as the Third Pole or the water tower of Asia, the HKH stores more ice and snow than any other region outside of the Antarctic and Artic (UNEP, 2022) and is the source of more than ten river systems sustaining nearly 2 billion people in the river basins of Central, Northeast, South and Southeast Asia (ICIMOD, 2023). Panel experts explored the complex interplay of climate change, glacial melt, and the increased risk of glacial lake outburst floods (GLOFs). The discussion centered on the urgent need for integrated water management strategies and translating scientific research into practical policy solutions, all while prioritizing community engagement and addressing mental health implications for affected populations.

Recommendations:

1. Urgent Emissions Reductions: Rapidly decrease greenhouse gas emissions to avert catastrophic cryosphere loss.

2. Enhanced Monitoring & Research: Invest in expanded data collection and modeling for better understanding of cryospheric processes at the national, regional and local levels.

3. Strengthen Regional Cooperation: Foster collaboration among countries for transboundary challenges like GLOF risk and water management that could include a regional legal framework with accompanying shared resources.

4. Integrated Water Management: Implement sustainable water management strategies to optimize resources in the face of declining availability. Translate scientific findings into actionable policies across sectors to protect the cryosphere and downstream populations, emphasizing the need to bridge the science-policy gap.

5. Community Empowerment: Engage local communities in decision-making, provide resources, and address mental health needs.

Session 2: Protecting Rivers

The second session focused on the challenges of balancing Bhutan's economic reliance on hydropower with the need to protect river ecosystems and manage transboundary water resources sustainably. The discussion explored the impacts of climate change, particularly glacial melt and extreme weather events, on river flows and hydropower generation. Bhutan has built about 10% of its total hydro capacity to date. More projects are being planned, however there is already solid evidence of decreasing flow trends that are having significant impacts on hydro production, particularly during the winter months. Participants emphasized the importance of inclusive water governance, involving local communities and diverse stakeholders, and moving beyond traditional top-down approaches to water management.

Recommendations:

1. Sustainable Hydropower: Prioritize storage-based projects, pump storage, rigorous environmental safeguards, mitigation measures (ecological flows, fish ladders), long-term monitoring, and preserving some free-flowing rivers.

2. Transboundary Cooperation: Work towards transboundary agreements, shift to a benefit-sharing approach, use neutral facilitators, collaborate beyond water sharing, and build trust through small-scale projects and continuous dialogue.

3. Adaptive Management: Increase water storage, implement nature-based solutions, adapt protected areas, develop watershed-specific plans with community involvement, and promote international agreements regarding water management.

4. Stakeholder Engagement: Include diverse perspectives, prioritize local communities, and consider engagement at multiple scales (local to regional).

5. Water Literacy: Educate on water rights/usage and hydropower, and share best practices from other regions both locally and internationally

Session 3: Glacial Perspective

This session opened with the screening of the documentary, “Bhutan Mountain Man: Video Diaries from a Lone Glaciologist”, by Arun Bhattarai, and was followed by a panel discussion offering diverse perspectives on glacial recession, the scientific realities of glacial losss and the cultural and societal repercussions. Discussions centered on the tangible impacts of glacial loss on communities and future generations, the interplay of cultural beliefs with scientific understanding, and the logistical and capacity-related hurdles faced by glaciological research in Bhutan. The role of media and storytelling in promoting climate awareness was underscored, as was the critical need for global collaboration and individual responsibility in addressing climate change to protect these vital resources.

Recommendations:

1. Strengthening Bhutan’s Glaciology and Hydrology Workforce:

There is a need to encourage and train more young professionals in glaciology and hydrology to ensure continuity in the scientific research to date. It was recommended that an increase in recruitment efforts be made including providing incentives for youth to pursue careers in these fields.

2. Improving Technical Support and Infrastructure:

Glaciology work in Bhutan is dangerous, arduous and painfully time consumer. There is a need for continual upgrading of equipment for glaciologists to enhance personal safety and research efficiency. Develop simple, safe, and fast technological solutions to make glacial research more accessible.

3. Policy and Funding for Climate Action:

Increase funding and capacity-building initiatives to support glacial research and sustainability efforts. Stronger international commitments to reduce GHG emissions are needed, along with increased funding for vulnerable nations. A long-term national strategy should integrate scientific research, traditional knowledge, and community perspectives.

4. Media and Storytelling for Awareness:

Utilize films and storytelling to highlight the sacrifices and importance of glaciologists’ work. Distribute documentaries and related content across multiple platforms to raise awareness at a global level.

Session 4: Groundwater Use

Historically, groundwater has been a limited water source for Bhutanese society, however with climate change and water use pressures, there is a rethinking of this resource. Although groundwater and surface water are a single resource they are often treated separtely. This panel framed groundwater management as a critical global challenge and then focused on Bhutan's unique position to proactively manage this resource. Recognizing the unsustainable depletion occurring worldwide, the panel explored how Bhutan can learn from the mistakes of other nations. The discussions delved into the specific data gaps, policy challenges, and hydrogeological complexities facing Bhutan, leading to recommendations for developing a comprehensive, sustainable, and precautionary approach to groundwater management.

Recommendations:

1. Data collection is critically needed: Create a comprehensive groundwater mapping program. Implement a tiered approach to data collection, starting with broad assessments (Tier I) to identify priority areas for more detailed studies (Tier II). Mapped groundwater resources should include identifying vulnerable recharge areas that require legal protection.

2. Prioritize Surface Water Efficiency: Focus on maximizing the efficient use of surface water resources while simultaneously building a knowledge base on groundwater.

3. Revisit policy framework and development of groundwater management strategy: Develop a dedicated groundwater management strategy with clear objectives and implementation mechanisms.

4. Create a central environmental data repository: Establish a centralized system for documenting drilling activities, geological data, borehole logs (including both successful and failed attempts), water quality data, and water licenses.

5. Groundwater allocation plans: Develop allocation plans similar to forest management units, based on data and prioritizing the management of risky areas, while considering transboundary issues. Apply a precautionary principle to avoid over-extraction using caution and thorough assessments before large-scale extraction.

6. Include vulnerable communities in decision-making: Implement bottom-up approaches, ensuring community, women, and indigenous groups participate in decision-making processes.

7. Inclusivity: Exercise more state control over groundwater resources to ensure equity and inclusiveness in its access and allocations.

Session 5: Advancing Integrated Water Resource Management (IWRM)

This session tackled the multifaceted challenges of advancing integrated water resource management (IWRM) in Bhutan within the context of a changing climate. Integrated water resource management is an approach that coordinates the development and management of water and related resources with the intent to maximize economic and social welfare with equity and protection of the planet's ecosystems (UNEP; 2025). The panel's discussions examined the specific impacts of climate change on Bhutan's water resources, alongside the growing demands and governance complexities that hinder effective water management. The session explored solutions focused on strengthening data collection and monitoring, improving water management practices, enhancing institutional capacity and coordination, prioritizing community engagement, and securing sustainable financing for water projects.

Recommendations:

1. Strengthen Data Collection and Monitoring:
    a. Expand and enhance data collection networks (hydrology, meteorology, cryosphere).
    b. Develop comprehensive information on freshwater lakes and river storage.
    c. Improve climate projections and impact assessments specific to Bhutan.

2. Improve Water Management Practices:
    a. Promote water conservation practices in urban areas and industries.
    b. Implement stricter regulations on effluent discharge and industrial pollution.
    c. Improve water distribution infrastructure to address localized shortages.
    d. Transition to closed-channel irrigation systems, drip irrigation, and other modern technologies.
    e. Enhance water-use efficiency through better planning and technology adoption.

3. Strengthen Institutional Capacity and Coordination:
    a. Enhance cross-sectoral coordination in water resource planning and management.
    b. Strengthen institutional coordination and capacity for IWRM implementation.
    c. Provide stronger political and administrative will to operationalize IWRM.

4. Prioritize Implementation and Adaptation:
    a. Focus on implementing water policies and adaptation strategies through continually revising plans.

5. Community Engagement and Traditional Knowledge:
    a. Involve local communities in water management initiatives through participatory approaches.
    b. Integrate traditional knowledge into water management solutions.

6. Secure Financing:
    a. Seek investments in sustainable water projects through climate financing mechanisms like Green Climate Fund(GCF) and Global Environment Facility(GEF).
    b. Explore public-private partnerships (PPPs) for water infrastructure projects.
    c. Strengthen water governance to attract investment.
    d. Ensure adequate budget allocation towards effective water policy implementation.

7. Improve Data-Driven Decision Making:
    a. Strengthen data collection and management for improved decision-making.
    b. Integrate surface and groundwater management.

Session 6: Commercializing Water in Bhutan

This session was designed and delivered by JSW School of Law's Environmental Law Clinic students. Their work explored the concept of water commercialization in Bhutan, framed as regulated private sector involvement in water supply and distribution while maintaining state ownership of the country's water resources. The discussion covered the findings of independent research and community surveys, focusing on potential benefits, environmental sustainability risks, the protection of historical water-sharing practices, and the safeguarding of human dignity. The session presented innovative approaches, international case studies, and addressed audience questions to understand diverse perspectives on this complex issue.

Recommendations:

1. Mandatory, rigorous Environmental Impact Assessments (EIAs) for all water commercialization projects.

2. Implement a robust monitoring system to track water levels, quality, and ecosystem health.

3. Develop a clear and comprehensive regulatory framework for water commercialization, incorporating the principles of sustainability, equity, and community participation. Such a framework would contribute to strengthening the existing *Water Act of Bhutan* (2011) to explicitly address water commercialization.

4. Establish Community Water Boards with meaningful decision-making power.

5. Ensure that water commercialization projects implement tiered pricing, subsidies, or other mechanisms to ensure affordability.In addition, dmand that there be the establishment of accessible grievance redressal mechanisms.

6. Invest in capacity building for government officials, local communities, and private sector partners to ensure effective implementation and management of water commercialization projects.

7. Establish a system for continuous monitoring and evaluation of water commercialization projects to assess their impacts and make necessary adjustments.

8. Ensure that all commercialization efforts prioritize access to safe drinking water, as defined by WHO standards.

Session 7: Investing in Sustainable Water

This session explored the critical role of water in achieving broader sustainable development goals, placing particular emphasis on opportunities for climate adaptation. Discussions addressed the unique water challenges faced by Bhutan, including the paradox of seasonal abundance and scarcity, and the difficulties in accessing climate finance. The session also highlighted the need for private sector involvement and explored a range of potential solutions, from sustainable watermanagement practices to nature-based solutions.

Recommendations

1. Promote sustainable water management through implementing sustainable water management practices across all relevant institutions.

2. Strengthen river basin management by empowering River Basin Management Organizations.

3. Recognize water's economic and social value by using economic instruments to manage demand and improve efficiency.

4. Invest in Water Treatment Plants to address water pollution risks through increased treatment capacity.

5. Balance hydropower development with environmental and ecological safeguards.

6. Implement comprehensive flood management and control, including Early Warning Systems (EWS).

7. Employ water storage techniques including rainwater harvesting and groundwater storage.

8. Conjunctive use of water, maximizing use of both surface and groundwater.

9. Ensure inclusive stakeholder participation in water management.

10. Use Digital Information Systems for water resource management.

11. Capacity Development: Strengthen the capacity of water management units.

12. Employ Nature-Based Solutions through promoting community stewardship, springshed revivals, and partnerships.

13. Assess integrated policy and solutions with concessional financing.

14. Leveraging "Green Premium": Utilizing the "Green Premium" of a place to attract sustainable financing.

Session 8: Water User Groups & Community Engagement

Session 8 explored community engagement as a cornerstone of successful and sustainable water management in Bhutan. Participants explored how empowering local communities through Water User Groups (WUGs) and integrating traditional knowledge can lead to more effective and culturally appropriate solutions. The discussions also focused on innovative financing mechanisms, collaborative partnerships, and strategies for scaling up successful pilot projects into broader government policies.

Recommendations:

1. Rather than relying on short-term funding, NGOs and CSOs should focus on developing sustainable systematic approaches with policy integration.

2. Payment for Ecosystem Services (PES): A sustainable financing model where urban water users pay fees to rural communities managing water sources.

3. Develop a collaboration between Government and development partners, NGOs and CSOs act as supplementary partners to the government, while technical support comes from government agencies.

4. Endorse a Community Engagement & Ownership Approach, thereby ensuring rural communities not only understand the issues at hand but are active participants in changing conditions and witnessing tangible impacts on their daily lives.

5. Encourage Mutual Support Between CSOs and Government by implementing grassroots-level interventions.

6. Strengthening Public-Private Partnerships (PPP): CSOs, NGOs, and government agencies must align efforts and pool resources to address rural water scarcity and climate resilience.

Session 9: Urban and Rural Water Management Practices

This session addressed the unique challenges and opportunities in urban and rural water management practices in Bhutan, with a focus on achieving equitable and sustainable water access for all. Discussions encompassed the need for cross-sectoral coordination, climate resilience, infrastructure upgrades, community engagement, data-driven decision-making, financial sustainability, and policy strengthening. The session also highlighted specific issues faced by Thimphu and rural communities, emphasizing the need for tailored solutions to address these distinct challenges.

Recommendations:

1. Adopt an Integrated Water Resource Management (IWRM) approach to water supervision.

2. Focus on Watershed Conservation and Management.

3. Human Capital Development should include the development of a water curriculum.

4. Water Tariff and Financing should include water tariff levies, implement public private partnership funding proposals, and include climate adaptation investment planning.

5. Integrate Water Sensitive Urban Design (WSUD) into Urban Planning.

6. New technologies and automation systems to be employed including integrating GIS based network mapping and Water 4.0.

7. Thimphu-Specific Actions:
    a. Phasing out community-managed water programs.
    b. Rectifying aging pipelines.
    c. Enhancing networks with GIS features.
    d. Realigning flood-prone transmission lines.
    e. Integration of water supply networks.
    f. Smart water management.
    g. Provision of alternative supply for affected areas.

8. Rural Water Supply Improvements:
    a. Revive Water Caretaker system
    b. Implement community-based water management strategies.
    c. Develop resilient intake designs.
    d. Protect pipes from extreme weather conditions

9. Revise the Water Act for climate resilience and inclusivity.

10. Promote public awareness and community engagement.

11. Invest in irrigation and climate-resilient crops.

12. Conduct Feasibility Studies, including participatory planning and technical monitoring regarding anticipated water infrastructure failures.

13. Make use of climate-resilient water infrastructure that will withstand peak floods & serve for 10-30 years. Endorse policy shifts required for larger-scale water sourcing & storage.

Session 10: Charting the Course: Collaborative Strategies for Water Conservation and Climate Resilience - Creating a Roadmap

This final plenary session addressed the multifaceted challenges of water supply and management in Bhutan, emphasizing the interconnectedness of climate change, infrastructure deficiencies, fragmented governance, and the imperative of community involvement. The session canvassed current challenges with the water management and supply system along with suggested technologies which could improve the situation. Discussions focused on the effects of climate change, challenges of the current system of water governance and concluded with various water-based challenges and proposed solutions.

Recommendations:

1. Improve Infrastructure:
    a. Upgrade water supply infrastructure in both rural and urban areas, addressing aging infrastructure, leakage, and inadequate maintenance.
    c. Develop localized climate-resilient infrastructure solutions.
    d. Construct water treatment and storage facilities.
    e. Implement Integrated Basin Management (IBM), utilizing nature-based solutions (NBS).

2. Implement Technology and Data Management:
    a. Implement smart monitoring systems to detect leaks, optimize distribution, and Improve billing.
    b. Establish a centralized data repository for water quality, supply levels, and Infrastructure conditions.
    c. Make billing and data collection automated to ensure more efficiency and transparency.

3. Sustainable Groundwater Use:
    a. Conduct comprehensive assessments and feasibility studies before large-scale groundwater extraction.
    b. Establish proper regulatory frameworks to prevent over-extraction and depletion of groundwater reserves.

c. Different models of commercialization to be explored, including full privatization, partial operational transfers, or a hybrid approach.

4. Address Climate Change Impacts:
    a. Implement climate resilience measures across multiple sectors.
    b. Develop sustainable water storage solutions (natural and built).
    c. Integrate climate considerations into Water, Sanitation, and Hygiene(WASH) programs.
    d. Develop water-sensitive urban planning to reduce vulnerability to climate variability.

5. Governance and Collaboration:
    a. Promote Integrated Water Resource Management (IWRM) for a holistic approach.
    b. Improve coordination among government agencies.
    c. Strengthen hydrological research facilities.
    d. Foster collaborations between policymakers and technical experts.
    e. Establish water user associations and formalize community participation in decision-making.
    f. Streamline access to climate adaptation funds (GCF, Loss and Damage Fund).

6. Financing and Investment:
    a. Develop a Climate Adaptation Investment Plan for the water sector.
    b. Explore various funding models (grants, hybrid loans, private sector investments).
    c. Establish a dedicated water trust fund.
    d. Explore Foreign Direct Investment (FDI) and partnerships with institutions like the World Bank and Asian Development Bank(ADB).

7. Community Engagement and Capacity Building:
    a. Empower communities to take responsibility for water management.
    b. Train and employ local communities in maintaining water resources.
    c. Support policy implementation and raise awareness through Civil Society Organizations (CSOs).

8. Transboundary Cooperation:
    a. Maintain careful cross-border cooperation, especially with Bangladesh.
    b. Consider downstream populations in hydropower use.
    c. Transboundary water cooperation model: Explore potential economic benefits, such as a water usage tax, by treating water before it flows downstream to India.

9. Research and Development:
    a. Expand research into smaller streams and tributaries.
    b. Strengthen research infrastructure.
    c. Develop water management curricula.
    d. Ensure that research findings inform policy decisions and infrastructure design.

10. Commercialization of water supply:
    a. Must have structured pricing model that ensures cost recovery while maintaining accessibility for all

Cross-Cutting Priority: Data-Driven Decision Making for Water Security

A persistent and overarching theme emerging from all sessions of the Paro Forum 2025 is the imperative for improved data collection, monitoring, and its seamless integration into water resource management and policy decisions. This thread runs consistently through the discussions on hydrology and glacial melt, river protection, groundwater use, integrated water resource management, sustainable water investments, and urban/rural water management practices. Specifically, the forum participants consistently emphasized the following aspects of data-driven decision making:

1. Enhanced Monitoring and Research: Investing in expanded data collection networks (hydrology, meteorology, cryosphere), modernizing data collection infrastructure, and improving climate projections and impact assessments were repeatedly identified as foundational requirements. This includes a focus on both scientific data and traditional knowledge.

2. Data Accessibility and Management: The forum highlighted the importance of creating centralized data repositories, fostering data sharing, and ensuring the accessibility of this information to researchers, policymakers, and communities. Streamlining and automating data collection and analysis was also emphasized for efficiency.

3. Integrating Data into Policy and Planning: Translating scientific findings and monitoring data into actionable policies and management strategies was seen as essential to bridge the "science-policy gap." This requires robust policy frameworks that are informed by the best available data and that can adapt to changing conditions.

4. Policy Integration and Adaptive Management: Data and monitoring are vital for adaptive management strategies, enabling continuous learning, informed adjustments to policies, and the evaluation of management practices' effectiveness. This includes regularly reviewing and revising plans based on new information and changing conditions.

5. Technology & Automation: Investing in smart monitoring systems to detect leaks, optimize distribution, and improve billing systems. Emphasis to integrate a Geographical Information System (GIS) to help create a network based on maps.

6. Greater support for Government Departments and Agencies: In order to embed water management across all sectors of Government and society, greater resources need to be made available to the caretakers of the water systems in Bhutan, such as the Department of Water, the Department of Foresty and the units within the Ministry of Agriculture.